which have not previously been figured are selected for illustration.

The total number of species catalogued in this volume is 907, and the number of eggs 8474; the latter are, however, very unevenly distributed among the various species, of many of which there is but a single egg in the collection. This is the case, for instance, with three out of the four species of "frog-mouths" catalogued, and likewise with many of the kingfishers, cuckoos, and humming-birds.

The collection is especially rich in eggs of the common cuckoo, associated in a large number of cases with the clutches laid by their involuntary foster-parents. After remarking on their variability in size, the authors state that the cuckoo's eggs likewise present a considerable range of diversity in colour and the character of the marking, although the great majority approach in these respects to the eggs of the meadow-pipit and skylark. Eggs of this type constitute the great bulk of the series in the collection. Some, however, like those associated with the eggs of *Ruticilla phoenicurus*, are blue, while one closely resembles that of a chaffinch. Curiously enough, cuckoos' eggs from hedge-sparrows' nests are of the ordinary type, and show no tendency to become blue. Altogether, the collection includes cuckoos' eggs taken from no less than forty-one different species of birds, ranging in size from a shrike to a fire-crest.

Did space permit, many other interesting points connected with öology might be mentioned; as it is, we must bring our remarks to a close with the expression of our opinion of the great interest of this unique work. R. L.

MODERN SCIENCE POPULARISED.

New Conceptions in Science. By Carl Snyder. Pp. xii+362. (London and New York: Harper and Brothers, 1903.) Price 7*s.* 6*d.* net.

IN the absence of any preface, it is necessary for the reader to form his own opinions as to the aim or object of the book considered as a whole. This, evidently, is to arouse an interest in scientific work among unscientific people by telling the story of the discoveries of the day in unscientific language. We have here portraits of the man that weighed the crown of King Hiero, of the man that broke the atom into ions, of the man that caught and fought the deadly microbe, and other pioneers of science introduced in terms somewhat suggestive of those we have used above. Several of the illustrations show the discoverers at work in their own laboratories, and remind us that this book hails from the same land which in recent years has flooded our breakfast tables with portraits of literary men writing articles by the side of revolving bookcases.

We have spoken of the book as being written in unscientific language, but it would be better to describe the language as unconventional, unorthodox, and very funny to an English mind. As instances, we may quote "chips of atoms" as applied to corpuscles; Marconi is described as having "since the Salisbury Plain trials with kites, taken to the water wholly," and, later on, it is said of him, "Then the tireless experimenter looked out over waste seas, saw in fancy the foggy banks of Newfoundland and said confidently 'That's the next.'" Again, "The Hertz-waves have had a sort of Messianic history. They had been foretold." "This scale" (speaking of Centigrade) "is in universal use throughout the world save in two backward countries called England and the United States." (The author forgets that there are certain enlightened countries which still use Réaumur's scale.) "If like this mechanical eye our eyes were sensitive to these electrical waves, then we might watch the progress of a play in Buenos Ayres or have witnessed the struggles at Peking." "Those who were reared to the ideas of Clerk Maxwell, regarding electricity as a wave and wobble in the highly hypothetical ether, have not failed to implant upon the new theory their collective feet." Light and other waves are stated to "clip through space at 184,000 miles per second." "If, as Prof. Dolbear picturesquely remarks, we could some way get a 'kick' on the ether, space navigation would be easy. It does not seem impossible that we shall be able to do this within another hundred or two hundred years."

The book is not confined to physical science alone. It contains a chapter on Prof. Loeb's discovery of artificial parthenogenesis, another on the nature of life, in which is suggested the possibility of reversing the life processes and growing backward, and a chapter headed "The Spirit Rappers, the Telepaths and the Galvanometer." Seriously speaking, the most important chapter is undoubtedly that dealing with "America's Inferior Position in the Scientific World." In it, among other points, the author urges the necessity of founding an institution like our Royal Institution in America, and directs the attention of his fellow countrymen to their general backwardness in research. We over here are apt to think of the American man of science as being pretty well off in view of the large number of universities existing in the United States, and the large number of chairs attached to each of them, which should result in the individual professors having far more time for research work than they have in this country. If, however, the author succeeds in impressing on his fellow countrymen the need of devoting further endowments for the furtherance of research work pure and simple, the book will not have been written in vain. The danger is that the important part played in science by long formulæ involving dx's and dy's, inverted deltas and signs of integration will be overlooked. G. H. B.

APPLIED PSYCHOLOGY.

Outlines of Psychology: an Elementary Treatise with some Practical Applications. By Josiah Royce, Ph.D., LL.D., Professor of the History of Philosophy in Harvard University. Pp. xxvii + 392. (New York: the Macmillan Company; London: Macmillan and Co., Ltd., 1903.) Price 4*s.* 6*d.* net.

THE number of persons who are anxious to study psychology in order to make themselves more efficient as teachers is already large, and is happily

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increasing very rapidly. This book is designed to introduce them to the study of the subject, and may be warmly recommended to them, but it is worthy of the attention of the professional psychologist also. The special features of the book are the freshness and clearness of the treatment, and the novel arrangement of mental phenomena under the three heads sensitiveness, docility, and initiative. Prof. Royce thus ignores the traditional divisions of the subject, which, though merely survivals from the old and misleading faculty-psychology, have largely determined the mode of treatment of most modern writers. By so doing he is enabled to treat every mental process as a whole having cognitive, conative and affective aspects.

Though not himself an experimenter or a physiologist, Prof. Royce fully and generously admits the importance of physiological and experimental psychology, and recognises that the advance of the subject represented by this book is largely due to modern work by those methods; his sketch of the functions of the nervous system and his numerous references to physiological considerations are altogether admirable and judicious, and he shows how greatly experimental methods have furthered our analysis of mental processes.

Here and there throughout the chapters practical deductions of the first importance to teachers are clearly and soundly drawn; for example, it is admirably shown how "differentiation of the simultaneous slowly results from the repeated acts, and from the powers of discrimination which have been cultivated in connection with them," and there follows the maxim, "Undertake to systematise this differentiation of consciousness through fitting series of successive deeds."

One of the most novel features is the treatment of the feelings. While agreeing with Wundt in regarding the classification of feelings into the two groups, pleasant and unpleasant, as very inadequate, Prof. Royce does not accept that author's six classes, but regards feelings of quiescence and of restfulness as two classes of antagonistic feelings correlative with the pleasant and unpleasant. In the chapter on the conditions of mental initiative, the importance of this distinction is fully illustrated. It is there forcibly shown how "mental initiative" depends upon "a certain overwealth of persistent activities" not immediately adaptive and not necessarily pleasant, and it is asserted that "all such activities are characterised by the feeling of restlessness. In their physical aspects they are examples of the 'tropisms' of Loeb." This last statement is difficult to accept. In the introduction Prof. Royce shows that he has been much impressed by the phenomena of "tropism" as manifested by lowly organisms, and he seems to feel that the conception of the "tropism" is of great importance for psychology. But the later references to the subject do little to justify the expectations thus aroused. In the case of the "overwealth of persistent activities" which are so important for mental growth, it would seem to be truer to say that they are examples of "irritability," the fundamental property of all living substance, and to treat them as examples of "tropisms" is not warranted by any considerations advanced in the book or known to the present writer.

The concluding chapters deal with varieties and abnormalities of minds, and many valuable hints are given as to the special treatment of individuals demanded of the teacher and parent. Among all the many books on psychology, there is none that within so small a compass, can give more insight into the life of the mind, and none that can be studied by schoolmasters with greater or equal advantage to their professional efficiency.

W. McD.

OUR BOOK SHELF

Animal Studies: a Text-book of Elementary Zoology for Use in High Schools and Colleges. By David Starr Jordan, V. L. Kellogg, and Harold Heath, of Leland Stanford Jr. University. Pp. 459; 259 figures. (New York and London: Appleton and Co., 1903.) Price 5s. net.

THIS is an interesting and delightful text-book of elementary zoology, combining some parts of "Animal Life" and "Animal Forms," in the same series, with new material on classification, extinct forms, geographical distribution, special adaptations, instincts, and economic value. Beginning with chapters on the conditions of animal life and the principles of classification, the volume takes a survey of the most important classes from Protozoa to mammals. Then follow chapters on life-histories, the struggle for existence, adaptations, animal communities, commensalism and parasitism, protective resemblances and mimicry, the special senses, instinct and reason, and so on. When we compare a school-book on geography of a quarter of a century ago with the best modern school geography, we seem to breathe a different atmosphere, and so it is when we compare the natural history for schools which was in circulation twenty-five years ago with this lively, up-to-date, well thought-out, beautifully illustrated, and, in short, well adapted modern school text-book of zoology.

We quote, in illustration of its educational value one example:—"At one time we had two adult monkeys, 'Bob' and 'Jocko,' belonging to the genus Macacus, neither with the egg-eating instinct, and a baby monkey, 'Mono,' of the genus Cercopithecus, whose inherited impulses bore a distinct relation to feeding on eggs, just as the heredity of Macacus taught the others how to crack nuts or to peel fruit. To each of these monkeys we gave an egg, the first that any of them had ever seen." The result of the experiment was in the highest degree instructive. Mono cracked the egg against his upper teeth, made a hole in it, and sucked it. "Then holding the egg-shell up to the light and seeing that there was no longer anything in it, he threw it away." He treated all subsequent eggs in the same expert fashion, while "Bob" and "Jocko" treated their eggs like nuts, and therefore ineffectively.

We recommend this book strongly; it is simple but not superficial, it is both interesting and instructive; it is written with an educational perspective. It is particularly desirable in elementary books that every general statement should be critically scrutinised, and the standard of accuracy in this volume is a high one. We are not, however, prepared to accept every statement, *e.g.* that fur-seals "absorb the water needed through pores in the skin."

J. A. T.

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